NEWS REPORT

H. D. Gardner

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NEWS REPORT

National Academy of Sciences *National Research Council*

VOLUME VIII *March-April 1958* NUMBER 2

Medical Follow-up Studies on Veterans*

GILBERT W. BEEBE, *Professional Associate*

Follow-up Agency, Division of Medical Sciences

MOBILIZATION for World War II and its conduct on a worldwide front created a vast and complex medical experience. In the U. S. Armed Forces military considerations dictated that this experience be recorded, codified, and indexed on a scale previously unknown to most medical investigators. With demobilization came the realization that the war had created an unparalleled resource for the investigation of the natural history of disease and injury in young adult males. Many medical officers were attempting to make some provision for following up the patients who had come under their personal care, but Dr. Michael E. De Bakey was apparently the first to appreciate the possibilities for systematic investigation inherent in the records of World War II. Having an investigative interest in the natural history of disease and being Chief of the Surgical Consultants Division, Office of the Surgeon General, U. S. Army, Dr. De Bakey was in a strategic position to formulate an over-all program and to insure its mature consideration.

In a memorandum to The Surgeon General dated March 5, 1946, Dr. De Bakey developed the concept of a long-term follow-up clinical research program based on military material. He drew General Kirk's attention to the variety and volume of the medical experience in the rigidly controlled military community, with its complete reporting of the facts of injury, illness, functional defects, and medical care. He foresaw the strong ties of the veteran to the U. S. Government through the Veterans Administration (VA) and visualized a cooperative undertaking of the U. S. Army and the Veterans Administration with the possible assistance of the Academy–Research Council to exploit this opportunity systematically. Dr. De Bakey's notions were discussed and elaborated in the professional divisions of the Office of the Surgeon General and in a conference at the Academy–Research Council held in April 1946. That conference recommended the appointment of a technical committee "to explore the most effective means by which a medical research program utilizing this material can be carried out." An ad hoc committee under the chairmanship of Dr. Edward D. Churchill was promptly organized and set to work on a blueprint for a program. On the basis of the committee's report the Academy–Research Council was asked by the interested federal agencies to establish a permanent Committee on Veterans Medical Problems to organize and direct the program. This Committee is still active and serves the Veterans Administration as a broad advisory

*Based on a paper read before the Society of Medical Consultants to the Armed Forces, November 11, 1957.

body as well as directing the program of medical follow-up studies. The present membership is as follows:

ESMOND R. LONG, University of Pennsylvania, *Chairman*
DAVID A. BOYD, JR., University of Minnesota and Mayo Clinic
WILBURT C. DAVISON, Duke University School of Medicine
MICHAEL E. DE BAKEY, Baylor University College of Medicine
JACOB E. FINESINGER, University of Maryland School of Medicine
A. MCGEHEE HARVEY, Johns Hopkins University School of Medicine
FRED J. HODGES, University of Michigan
CURRIER MCEWEN, New York University Bellevue Medical Center
DONALD MAINLAND, New York University Bellevue Medical Center
WILLIAM S. STONE, University of Maryland School of Medicine

To assist clinical investigators in planning and conducting studies requiring access to military and VA records, a specialized records and statistics office was established in the Division of Medical Sciences and has been in continuous operation since 1947 as the Follow-up Agency.

What specific elements in the military experience, in military records, and in veteran status create this opportunity for research in the natural history of disease? Among these elements the following are perhaps most significant:

1) The fact that men who have entered military service represent a definite and enumerated segment of the general male population. It can be readily determined whether any individual belongs to this segment and sampling may be conducted in accordance with the diverse requirements of medical investigation, including the selection of adequate controls.

2) The more than 22 million men who served in the Armed Forces during World War I, World War II, and the Korean War make this a large and representative segment. Although men of reasonably good health are selected for entry into the service and are, therefore, a very poor group in which to study, say, congenital defects and conditions appearing during childhood and adolescence, such selection is actually an advantage in the investigation of conditions originating during or after service. In the age groups which contributed most heavily to World War II, it has been estimated that more than 85 percent of the men reaching military age actually saw service. In a sample of this size even relatively rare diseases may be represented by adequate numbers to carry out a meaningful study.

3) The breadth and variety of medical experience in time of war, especially with regard to stress, trauma, and unusual diseases.

4) The central indexing of the medical records of the Armed Forces and the Veterans Administration by means of punched cards.

5) The completeness of the medical care provided during military service and the early recognition and diagnosis of an illness. Any complaint sufficient to excuse a man from military duty creates a permanent medical record.

6) The retirement programs for records of the federal agencies bring together in a permanent central file all the records of an individual. (At the most there will be two such files, one in the Armed Forces and another in the VA.)

7) The existence of a central file of pathological material in the Armed Forces Institute of Pathology and an active program for its study.

8) The existence of central locator files by which men and their records are readily found.

9) The fact that standard record forms and nomenclature are used for recording medical and other events of interest.

10) The fact that veterans of active service during periods of war are eligible for financial and other benefits of such variety and importance that almost all veterans can be located through the resources of the VA and that a significant part of the medical care needed by the veteran population is actually provided by the VA.

The Committee on Veterans Medical Problems has fostered the program of medi-

cal follow-up studies as a service to both federal and academic medicine, and it is clear that the program has functioned very much as Dr. De Bakey and the ad hoc committee intended. The broad representation of the members of the Division of Medical Sciences and its advisory committees has meant that the program has been broadly conceived and that the specific research proposals have been carefully screened.

In the early years the Veterans Administration provided all the necessary funds for the program, but at present the U. S. Department of Defense and the U. S. Public Health Service also participate in its financing. Most of the work is supported by contracts or grants in the usual pattern of the supporting agency. But funds are not the only means of support. Partners in the cooperative enterprise are military and civilian officials of several government agencies, especially the records custodians and management experts of the Armed Forces and the Veterans Administration. They have cooperated splendidly at every turn as have the research groups and the statistical offices in the participating agencies. By its very nature the program can exist only as a cooperative undertaking of the Armed Forces and the Veterans Administration. The Academy-Research Council provides the focal point to which the interested investigator may turn and a place where much of the work can be done or coordinated; the Public Health Service assists by providing funds. Investigators come from all of these agencies and from civilian research centers.

Since the organizing stimulus was one of method rather than concern with a specific problem, the projects undertaken thus far range widely over the field of clinical medicine and epidemiology. The subjects of investigation listed below all pertain to World War II veterans unless otherwise specified. Reports have been published on those marked with asterisks.

*Peripheral Nerve Regeneration, a follow-up study on 3,600 injuries, led by Barnes Woodhall.

Schistosomiasis, a follow-up on the World War II cases from Leyte, P.I., organized by Harry Most.

Arterial Injuries, a follow-up study on 800 acute injuries, aneurysms, and fistulas, by a group under the chairmanship of Daniel C. Elkin.

*Schizophrenia and Schizoid Reactions, a follow-up and epidemiologic study, by Stewart Wolf and Herbert S. Ripley.

*Fractures of the Carpal Scaphoid, a follow-up study by Joseph S. Barr.

*Wounds of the Hand, a follow-up study by Richard Warren.

Head Injuries, a follow-up study under the direction of A. Earl Walker, covering 1,000 cases.

*Sarcoidosis, an epidemiologic and follow-up study by Paul B. Beeson and Max Michael on about 400 cases including those of the Armed Forces Institute of Pathology.

*Tumors of the Testis, a pathologic and follow-up study by Robert A. Moore and Frank J. Dixon based on the series of about 1,000 cases accumulated by the Armed Forces Institute of Pathology.

*Rheumatic Fever, a clinical follow-up study by Ephraim P. Engleman on about 200 cases.

*Psychoneurosis, a follow-up and epidemiologic study led by Norman Q. Brill involving 1,500 Army and Navy veterans, plus comparison groups.

Fractures of the Femur, a follow-up study by Joseph D. Godfrey on about 200 cases treated by internal fixation with a comparable group treated by traction.

Mustard-Gas Injury and Pneumonia in World War I, an epidemiologic study by the writer to investigate the possible role of these early factors in the etiology of lung cancer; 7,500 men are under study.

Multiple Sclerosis, an epidemiologic and follow-up study led by Benedict Nagler, covering about 1,500 veterans plus controls.

Coronary Heart Disease, a follow-up study on 4,000 cases by Bernard M. Cohen.

*Hodgkin's Disease, a pathologic and follow-up study by Bernard M. Cohen and Hans F. Smetana based on the series of 400 cases accumulated by the Armed Forces Institute of Pathology.

*Prisoners of War, a follow-up on 4,000 POW's and a similar number of controls, by Bernard M. Cohen and Maurice Z. Cooper.

Buerger's Disease, a follow-up study by Michael E. De Bakey and Bernard M. Cohen on the Army series of about 1,000 cases.

Psychological Resistance to Stress of Ground Combat, an epidemiologic study of a representative sample of 2,500 riflemen in the Mediterranean and European theaters, by John W. Appel and the writer.

*Effects of Million-Volt X-ray on the Gastrointestinal Tract, a follow-up study organized by Aubrey O. Hampton on about 100 cases of testicular tumor treated at Walter Reed Army Hospital with a million-volt machine.

Cold Injury, a clinical follow-up study on 500 cases of trenchfoot and frostbite (ground type), headed by Daniel C. Elkin.

*Tuberculosis in Veterans of World War II, an epidemiologic study led by Jay Arthur Myers, comparing veterans and nonveteran students at the University of Minnesota following World War II.

*Tuberculosis in the Army, an epidemiologic and radiologic study by Esmond R. Long based on 3,000 men discharged for tuberculosis and 3,000 controls.

*Tuberculosis in Navy Recruits, an epidemiologic study led by Carroll E. Palmer.

Incidence of Cancer in Veterans, an epidemiologic study by Paul E. Steiner and others, aimed at determining the feasibility of systematic studies of differential incidence of cancer in veterans of World War I and II.

*Head Wounds and Perceptual Function, a program of special follow-up studies by Morris B. Bender and associates.

Scrub Typhus, a follow-up study by Francis C. Wood and others, based on the series of about 500 cases from the China-Burma-India theater.

*Viral Hepatitis, a follow-up study led by Roy H. Turner, covering both military and nonmilitary cases of serum and infectious hepatitis plus comparison groups.

Epidemic Hemorrhagic Fever, a follow-up study based on about 2,000 Korean cases, organized by Col Robert L. Hullinghorst.

Other studies are in advanced stages of planning and should be started within the next year or two. These include:

Rheumatoid Arthritis, an epidemiologic and follow-up study.

Hereditary and Environmental Factors in Disease, based on comparative studies of identical and fraternal twins. It is expected that a sample of 8,000 to 10,000 pairs of twins who served in World War II can be assembled as a resource for special studies by human geneticists and epidemiologists.

Lesions of the Lumbar Discs, an epidemiologic and follow-up study based on U. S. Army and Air Force material from World War II and the intervening period.

Nonfatal Wounds of the Heart, a follow-up of 150 to 200 World War veterans who survived wounds of the heart and great vessels.

Japanese B. Encephalitis, a follow-up study of U. S. Army and Marine Corps veterans of the Korean War.

To illustrate what can be learned from such studies a few examples have been chosen.

Psychoneurosis. In this study the investigators were able to make a systematic analysis of the chance of breakdown in relation to predisposition and military stress and the subsequent course of the illness over a 5- or 6-year period. The analysis revealed that only a few of the men who broke down could be regarded as screening errors. Conversely, psychiatric screening as now known cannot be relied upon to prevent much of the psychiatric burden of war. Breakdown is too much a response to stress for screening to provide the answer. Furthermore, many men with apparent predisposition to breakdown served long and well, including tours of combat. It would be hard to say that the men with psychoneurosis as a group in any sense failed to be of value to the service.

Follow-up examiners 5 to 6 years later concurred in the specific military diagnosis of psychoneurosis in 88 percent of the cases and found some psychiatric diagnosis appropriate in an additional 5 percent. Twenty percent of the men presented a picture of moderate disability, and another 8 percent severe disability, in the sense of impairment in functional capacity. Under 2 percent exhibited psychotic manifestations. Criminality and suicide were rare.

For the most part, men who were either quite normal or overtly neurotic at entry into service seemed unchanged at follow-up. Men in between these extremes had drifted down to some extent, and the more so if breakdown had occurred in combat. In 1950, 40 percent of the cases investigated were drawing VA compensation for disability, the median disability rating being 20 percent; the follow-up examiners considered that many of these had no psychiatric disability. Compensation *per se* appeared to have no dynamic influence either pro or con.

Tuberculosis in Navy Recruits. Tuberculin tests were done at enlistment on about 70,000 Navy recruits during the period 1949–51. The recruits were followed through December 1954 to determine the incidence of active tuberculosis in relation to tuberculin sensitivity and body build. The incidence of positive reactions in this nationwide sample of men aged 17 to 21 was 9 percent. During the 4-year period of follow-up, 109 active cases of tuberculosis were reported among the 70,000 recruits, giving an over-all rate of 0.4 cases per thousand men per year. For nonreactors, however, the rate was 0.3 and for

positive reactors it was 1.6, more than five times as high. Dr. Palmer and his colleagues believe that a high proportion of cases among the positive reactors must represent endogenous disease.

Height and weight at entry were unrelated to tuberculin sensitivity, but quite strongly related to the risk of active tuberculosis once infection had taken place. The incidence of active disease was four times as great in some types of body build as in others, and this was true whether attention was confined to nonreactors or to reactors.

Finally, these investigators conclude that for the detection of tuberculosis, the X-ray screening of tuberculin reactors continues to be profitable, while such screening of nonreactors is of doubtful value.

This study, together with the other two on tuberculosis, exemplifies the practical utility and scientific value of the military population for epidemiologic studies. A desirable next step would be to determine tuberculin status both at entry and at separation from service for an adequate sample so that the chance of infection itself might come under direct scrutiny.

Viral Hepatitis. Here the concern was that an acute infectious disease might set the stage for a chronic process. The intensive 5-year follow-up produced no evidence of important residual effects, but the patients are being kept under observation. An analysis is now being made on the 10- to 15-year period after the acute hepatitis.

There are two discernible trends in the content of the programs: *1*) in clinical surveys more use is being made of existing follow-up records of mortality, morbidity, and disability to supplement intensive clinical examinations; and 2) problems in statistical epidemiology are being undertaken more frequently. For studies of the latter type the sampling situation is often nearly ideal, for controls may be chosen according to criteria which may be made almost as rigorous as one may please. It had not been expected that the program would involve World War I veterans, although it is now plain that this is an ideal group for some purposes. It is not as readily sampled as World War II veterans since there no longer exists a punched card index to its medical experience, but for certain problems it may still be used. The twins are another surprise; realization of the dimensions of the opportunity here has developed only slowly, but extensive plans have now been made for a program of studies under the direction of a group headed by Dr. James V. Neel of the University of Michigan. This may eventually prove to be the most significant undertaking in the program.

What of the future? One literally cannot know all the future uses which may be made of these medical records, for even clinical research has a fast-moving front, and many of the problems of tomorrow await definition. However, the impressive flexibility of this research tool suggests that it will be at least as valuable in the future as in the past. As the veterans of World War II age, increasing emphasis will undoubtedly fall upon chronic and degenerative disease and upon the aging process itself, as specific research ideas emerge for testing.

SCIENCE NEWS

ANNUAL MEETING NATIONAL ACADEMY OF SCIENCES

The ninety-fifth annual meeting of the National Academy of Sciences will be held at the Academy building, April 28–30. Sessions for the presentation of scientific papers are scheduled for Monday, April 28, and Wednesday, April 30. The scientific sessions will be open to the public.

A short business session for Academy members will precede the first scientific session on Monday morning. The Sections of the Academy will meet separately late Monday afternoon after the scientific sessions. Tuesday, April 29, will be devoted to the election of officers and new members and to general Academy business.

In addition to the four scientific sessions of contributed papers, four symposia of in-

vited papers are being planned. The subjects chosen for the symposia are *1*) some aspects of solid state physics, *2*) color vision, *3*) conditions for creativity in science, and *4*) age relationships of ancient rocks.

On Monday evening there will be a special program for the presentation of Academy medals, followed by a reception for the medalists, members, and guests and a program of scientific demonstrations and exhibits.

The Academy dinner for members and their guests will be held Tuesday evening at the Shoreham Hotel. President and Mrs. Bronk will greet the members and their guests at a reception immediately preceding the dinner.

On Wednesday evening the customary buffet supper for members will be served in the auditorium of the Academy building. This occasion will provide an opportunity for informal discussion of Academy policies and activities.

The Committee on Arrangements is composed of the following members:

HUGH L. DRYDEN, Home Secretary of the Academy, *Chairman*
ERNST CLOOS, Johns Hopkins University
THOMAS B. NOLAN, U. S. Geological Survey
FRANCIS W. REICHELDERFER, U. S. Weather Bureau
J. F. SCHAIRER, Carnegie Institution of Washington
M. A. TUVE, Carnegie Institution of Washington

ARCTIC SEA ICE CONFERENCE

Under the sponsorship of the Office of Naval Research, the Division of Earth Sciences organized a 4-day conference on Arctic sea ice at the Tidewater Inn, Easton, Md., February 24–27, with over eighty scientists from nine nations in attendance. This was the first conference of its type ever held, and it was aimed at improving methods of predicting the formation of ice in the Arctic Ocean and neighboring areas. It was the hope of the conference organizers that a substantial interchange of information on an international level would lead to the solution of theoretical problems which have so far prevented individual research groups from achieving their practical goals. It was also felt that an interchange of knowledge on sea ice in the Arctic regions was overdue as a great deal of work has been going on in this field for almost a hundred years.

William R. Thurston, Executive Secretary of the Division of Earth Sciences, opened the conference on Monday evening and welcomed the participants. Three full days of technical sessions, including two evening sessions, followed.

The foreign scientists participating in the conference and their countries of origin are as follows:

Denmark

HELGE THOMSEN, Det Danske Meteorologiske Institut, Copenhagen

England

TERENCE E. ARMSTRONG, Scott Polar Research Institute, Cambridge
J. A. HEAP, Falkland Islands Dependencies Survey, Cambridge
C. W. M. SWITHINBANK, Scott Polar Research Institute, Cambridge

Finland

ILMO HELA, Institute of Marine Research, Helsinki
ERKKI PALOSUO, Institute of Marine Research, Helsinki

Germany

F. NUSSER, Dent Hydro Institute, Hamburg

Japan

KOU KUSUNOKI, Institute of Low Temperature Science, Hokkaido University
TADASHI TABATA, Institute of Low Temperature Science, Hokkaido University

Sweden

BERTIL RODHE, Statens Meteorologiska och Hydrologiska Institut, Stockholm
VALTER SCHYTT, Geografiska Institutet, Stockholm
RAGNAR V. A. THOREN, Royal Swedish Navy, Stockholm

U.S.S.R.

G. A. AVSYUK, Arctic Research Institute, Moscow
P. A. GORDIENKO, Arctic Research Institute, Moscow
A. G. KOLESNIKOV, Arctic Research Institute, Moscow
M. A. RYAZANOV, Arctic Research Institute, Moscow

The exchange of information during the conference was extremely helpful to all the participants and demonstrated again the utility of international cooperation in broad areas of scientific research. The papers presented at the conference will be published by the Academy–Research Council and will be available from the Publications Office sometime this fall.

MARITIME RESEARCH—A SYMPOSIUM AND CONFERENCE

The second annual symposium on maritime research was held at the Academy-Research Council building on February 13, with representatives of industry, government, and maritime research interests in attendance. The purpose was to bring executives together with research workers in order to stimulate interest in maritime research and in the results to be expected.

Vice Admiral E. L. Cochrane, U. S. Navy (ret.) and Chairman of the Maritime Cargo Transportation Conference Board of Advisors, welcomed the guests and introduced the symposium chairman, Henry W. Clark of the Alaska Steamship Company. The speakers and the titles of their papers were:

"Research Plans of the Maritime Administration," by C. R. Denison, U. S. Maritime Administration

"Containerization," by F. L. Weldon, Matson Navigation Company

"A Search for Optimum Container Size," by Maj. H. A. Ablett, U. S. Army Research and Engineering Command

"Trailership Construction Costs," by N. R. Farmer, George G. Sharp, Inc.

"Economics of Nuclear Propulsion," by F. B. Graham, Matson Navigation Company

"Systems Approach to Effective Documentation," by L. A. Selogie, University of California at Los Angeles

"Comparison of Shipyard Cranes vs. Burtoning Gear," by R. P. Delrich and A. W. Friedberg, Maritime Cargo Transportation Conference.

Papers presented at the symposium and a summary of the discussion will be published by the Academy–Research Council.

On February 14, the Maritime Cargo Transportation Conference held its second informal roundtable conference on the subject of current and future maritime research with about thirty participants in attendance. In contrast to the symposium held on the previous day, most of the participants were active research workers who met to exchange ideas on methods and plans. Under the guidance of V. A. Lewinson of the staff, the discussion was informal and will remain unrecorded.

The morning session was devoted principally to containerization studies. In the afternoon attention was given to the subject of publication and abstracting of maritime research. It was proposed that a meeting of interested organizations be called to discuss and recommend action on this important and difficult subject.

Glen Camp of The George Washington University delivered a half-hour talk on an operations research problem dealing with optimum utilization of a tanker fleet. This study exemplified the application of various operations research techniques in the maritime field.

OFFICE OF CRITICAL TABLES

The Office of Critical Tables held an organizational meeting of its Advisory Board at the Academy–Research Council building on February 3. The primary purpose of the meeting was to bring together a representative group from which the membership of the large Advisory Board could be drawn. Allen V. Astin, Director of the National Bureau of Standards, served as chairman for the meeting.

Most of the professional societies that cooperate with the Divisions of Chemistry and Chemical Technology, Engineering and Industrial Research, Earth Sciences, and Physical Sciences were represented. Also present were delegates from trade associations and government agencies, as well as a number of specialists from universities, who were invited because of the unique services which they render in the field of data handling.

S. Douglas Cornell, Executive Officer of the Academy, Frederick D. Rossini, Chairman of the Division of Chemistry and Chemical Technology, and Guy Waddington, newly appointed Director of the Office of Critical Tables, presented background material on the history of the Academy–Research Council's activities with regard to the critical tables and outlined the policies and plans of the new Office. The ensuing discussion brought out information about current and needed projects.

On the evening of February 3, the Executive Committee of the Office of Critical Tables met and formulated procedures for appointment of the Advisory Board that will be made up of fifty or more members to be nominated from the societies and other groups represented at the meeting. The Advisory Board will constitute a pool of talent from which specialized subcommittees may be selected.

PLASTICS IN BUILDING ILLUMINATION

The Plastics Study Group of the Building Research Institute held a two-day conference at the University of Houston, Houston, Tex., on March 4 and 5. The subject for discussion at the conference was "Plastics in Building Illumination: Daylight and Artificial Sources." O. L. Pierson of Rohm and Haas, Inc., Chairman of the planning committee, presided at the meetings, and Mike Gigliotti of the Monsanto Chemical Company, Vice-chairman, served as moderator.

The program was divided into three parts. The opening session on "Objectives of Building Illumination," consisted of descriptive and explanatory talks designed to help architects, engineers, and building technologists in establishing points of reference during the subsequent discussions on specific applications. The second session, "Plastics Applications in Building Illumination," featured five papers describing in detail the present applications of plastics for the transmission of light through transparent or translucent materials used as fixed or operating windows, walls or wall panels, and light controlling devices and light transmitting elements of electric light fixtures. The third session was devoted to future applications of plastics in building illumination and consisted of three main presentations.

INTERNATIONAL UNION OF THE HISTORY AND PHILOSOPHY OF SCIENCE

The U. S. National Committee for the International Union of the History and Philosophy of Science (IUHPS) held its first meeting at the Academy–Research Council building on January 18. This new Committee has been set up to effect appropriate United States participation in IUHPS and its two divisions through the Academy–Research Council, which adheres to the Union on behalf of the historians and philosophers of science in the United States.

At the meeting Ernest Nagel was nominated Chairman and Henry Guerlac, Vice Chairman; C. Doris Hellman was appointed Secretary. Three members-at-large were also nominated: Percy W. Bridgman, Richard H. Shryock, and Carl B. Boyer. All nominees have subsequently been appointed by the President of the Academy.

The U. S. National Committee has two permanent subcommittees, one on the History of Science and one on the Logic, Methodology, and Philosophy of Science. Marshall Clagett was elected chairman of the former, and Willard Van Orman Quine and Henry Margenau were elected chairman and vice chairman respectively of the latter.

The present membership of the Committee and the organizations represented are as follows:

Association for Symbolic Logic

WILLARD VAN ORMAN QUINE, Harvard University
BARKLEY ROSSER, Cornell University

History of Science Society

MARSHALL CLAGETT, University of Wisconsin
CHARLES GILLISPIE, Princeton University
HENRY GUERLAC, Cornell University
C. DORIS HELLMAN, Pratt Institute
CONWAY ZIRKLE, University of Pennsylvania

Philosophy of Science Association

C. J. DUCASSE, Brown University
ERNEST NAGEL, Columbia University
HENRY MARGENAU, Yale University

Members-at-large

CARL B. BOYER, Brooklyn College
PERCY W. BRIDGMAN, Harvard University
RICHARD H. SHRYOCK, Johns Hopkins University

Ex-Officio Members (voting)

PHILIPP FRANK, Director, Institute of the Unity of Science
STEPHEN C. KLEENE, President, Association for Symbolic Logic
ALFRED TARSKI, President, Division of the Philosophy of Science of IUHPS

Ex-Officio Members (non-voting)

RAYMOND J. SEEGER, Liaison Representative, National Science Foundation
ANDRÉ C. SIMONPIETRI, Associate Director, Office of International Relations

LECTURE BY WILLIAM R. SEARS

On Tuesday, February 4, William R. Sears, Director of the Graduate School of Aeronautical Engineering at Cornell University, delivered the fourth lecture in the 1957-58 Academy–Research Council series on the subject of magnetoaerodynamics.

Magnetoaerodynamics is a new field of science which is arousing considerable interest because of its potential application to missiles and rocketry. The science treats of

interactions of electric and magnetic fields on dielectric gases or fluids. The magnetic forces which result from these interactions can be exerted in the body of the fluid itself and not merely on the boundary surfaces.

Dr. Sears described some of the early experiments in magnetohydrodynamics which dealt with the influence of magnetic fields on the flow of such conducting fluids as mercury. He showed how a liquid metal "pump" had been made by inducing mutually perpendicular electric and magnetic fields in the fluid with the result that a current flow developed along the electric field and a pressure gradient was created normal to the mutual plane. No moving parts are required as in conventional pumps.

Dr. Sears told how speeds of vehicles reentering the atmosphere after flight in the exosphere have recently risen to such levels that disassociation of the air takes place with the result that the conductivity is greatly increased, presenting the opportunity of applying magnetoaerodynamics to influence the flow around the missile or satellite. The lecturer indicated three ways that magnetic fields could be used to cut down the huge amount of heat encountered during such re-entry: *1*) The boundary layer can be stabilized forestalling the transition from laminar to turbulent flow. *2*) The flow in the boundary layer can be retarded and the heat transfer rate reduced. *3*) When the magnetic field acts on such a large mass of fluid a "drag brake" is developed with the energy appearing in trailing vortices in the wake.

Another interesting application of magnetoaerodynamics may occur in the case of accelerating gases to extremely high speeds, as in the tail pipe of a rocket. To do this requires the use of an electric field as well as a magnetic field. Energy released by burning fuel in a conventional rocket is usually put into the exhaust gas at low speeds before the gas is expanded through the nozzle. By adding a magnetoaerodynamic system, energy may be added and the gas stream accelerated at any speed.

The challenge of producing a controlled thermonuclear reaction has been interlaced with the evolving science of magnetohydrodynamics. The terrifically hot plasma produced by fusion at 10^8 to 10^9 degrees Kelvin cannot be contained by a conventional "solid" wall. But since the plasma is completely ionized, the charged particles can be confined through the application of a magnetic field which forces the particles into the region of lower field density and effectively creates a magnetic "bottle" for the gas.

Dr. Sears pointed out that "some formidable technical difficulties must be overcome before these effects become practically useful. * * * The rewards of this new branch of engineering science seem to be great, so that the required amount of research and development may well be justified."

AMERICAN WOMEN DOCTORS TO VISIT U.S.S.R.

Six American women medical scientists will leave during the second week in May for a one-month tour of medical institutions in the Soviet Union. Preliminary arrangements for the trip have been completed by the National Academy of Sciences in cooperation with the Rockefeller Foundation, the American Medical Association, and the American Medical Women's Association. The itinerary within the Soviet Union will be planned by Soviet authorities to accommodate the visitors' special scientific interests.

The visit is the result of an exchange agreement entered into by the U. S. Department of State and the Soviet Union. Last October six women scientists from the U.S.S.R. spent a month in the United States visiting medical institutions. (See NEWS REPORT, Vol. VII, No. 6, p. 102, 1957.)

The American delegation will be headed by Helen B. Taussig of Johns Hopkins University Hospital, a pediatrician who has won international recognition for her contributions to the treatment of cardiac diseases in children. Other members of the delegation are:

LEONA BAUMGARTNER, Commissioner of Health, New York City
THELMA B. DUNN, National Institutes of Health
JEAN HENLEY, College of Physicians and Surgeons, Columbia University
ESTHER C. MARTING, University of Cincinnati School of Medicine
MARGARET H. SLOAN, National Academy of Sciences–National Research Council

CONFERENCE ON BLOOD PROBLEMS IN EXTRACORPOREAL CIRCULATIONS AND MASSIVE TRANSFUSIONS

The Subcommittee on Blood and Related Problems and its Panels on Transfusion Problems and on Blood Coagulation, sponsored a conference on February 7 to review blood problems encountered in the use of extracorporeal circulations and massive transfusions. In two sessions, under the chairmanship of Ivan W. Brown, Jr., of Duke University Hospital and William W. L. Glenn of the Yale University School of Medicine, 25 speakers from 16 institutions contributed reports on both clinical and laboratory aspects of these problems.

The general experience of the major centers doing open heart surgery was presented, and it was evident that each group was having many of the same problems. Some of these arose from the use of heparin to keep blood from clotting in heart-lung machines and artificial kidneys, and the necessity of neutralizing the heparin with protamine after the operation to restore the normal clotting ability of the patient's blood. Various ways of salvaging unused heparinized blood were considered, and a new anti-coagulant solution was proposed which would allow greater flexibility in the storage and use of blood drawn for such operations.

Another hazard discussed was the development of thrombocytopenia, a deficiency of blood platelets, which also interferes with normal clotting and increases the danger of hemorrhage. This condition is encountered following massive transfusions unless very fresh blood is given; it also results from the use of extracorporeal circulations, especially when prolonged, thus limiting their value for purposes such as the treatment of heart attacks. Much effort is therefore being devoted to studies of the effects of equipment and anticoagulant solutions on platelets, as well as on coagulation factors and red cell survival.

The testing of blood for compatibility also becomes a problem when large amounts, drawn from many donors, must be used. There was much discussion of the number and nature of the tests that should be performed.

The members of the Subcommittee and Panels felt that this conference had been very timely, and that it had helped to define the obstacles to be overcome in extending the use of extracorporeal circulations for longer and longer periods.

COMMITTEE ON STATISTICS

The Committee on Applied Mathematical Statistics was established early in 1943 for the purpose of furnishing advice on statistical personnel and on statistical problems in research, development, and production. Under the chairmanship of L. P. Eisenhart, Professor Emeritus of Princeton University, the Committee not only handled many requests for advice from universities, government agencies, and industry, but also carried out the following major tasks: *1*) the promotion of statistical quality control methods in American industry; *2*) a study of personnel and training problems created by the growth of applied statistics in the United States; *3*) the stimulation of applications of statistical methods in the chemical industry; and *4*) the expansion of applied econometric methods in American business and industry.

In its final report, submitted on June 6, 1957, the Committee described the urgent need in wartime for a group to exert leadership at the national level to introduce statistical methods more widely into industry, business, government, and the various fields of science. It also pointed to the continuing demand for advisory work, particularly in science and technology. Therefore, while recommending its own discharge as a committee in the Office of the Chairman of the Research Council, the report proposed a new standing Committee on Statistics in the Division of Mathematics with members interested in mathematical statistics, biometrics, econometrics, psychometrics, operations research, industrial statistics, and statistical problems in the physical sciences.

In accordance with these recommendations, the following committee has been appointed:

KENNETH J. ARROW, Stanford University, *Chairman*
FREDERICK MOSTELLER, Harvard University
JOHN W. TUKEY, Princeton University
W. ALLEN WALLIS, University of Chicago
SAMUEL S. WILKS, Princeton University

JOINT MEETING OF RADIO SCIENTISTS AND RADIO ENGINEERS

The U. S. National Committee of the International Scientific Radio Union (URSI) and the Institute of Radio Engineers (IRE) will again co-sponsor an annual spring meeting at the Willard Hotel, April 24–26. The three-day meeting will include one or more sessions of each of the following commissions of the U. S. National Committee:

Commission 1—Radio Measurement Methods and Standards
Commission 2—Tropospheric Radio Propagation
Commission 3—Ionospheric Radio Propagation
Commission 4—Radio Noise of Terrestrial Origin
Commission 5—Radio Astronomy
Commission 6—Radio Waves and Circuits (Information Theory, Circuit Theory, and Antennas and Waveguides)
Commission 7—Radio Electronics

The Institute of Radio Engineers will be represented by four Professional Groups on *1*) Antennas and Propagation, 2) Circuit Theory, 3) Instrumentation, and *4*) Microwave Theory and Techniques. The Professional Groups will meet jointly with the appropriate Commissions.

Preceding the joint meeting, the U. S. National Committee of URSI and the members of its seven Commissions will hold business meetings at the National Bureau of Standards in the morning and afternoon of Wednesday, April 23.

Additional information and preliminary programs may be obtained from the U. S. National Committee, URSI, Academy–Research Council.

NATIONAL RESEARCH COUNCIL MEETING

For the first time in its 40-year history the entire National Research Council will meet as a body at the Academy–Research Council building, March 30–April 1. Plenary sessions will be held on Monday morning, March 31, and on Tuesday afternoon, April 1. The meeting will open with registration and an informal dinner on Sunday evening, March 30, in the Ballroom of the Hotel Willard. President Bronk will preside, and talks on matters of general scientific interest will be included in the evening's program.

The plenary session on Monday morning will be devoted to five main topics: *1*) Education in Science, 2) International Aspects of Science, 3) Beyond the International Geophysical Year, *4*) Information and Documentation in Science, and 5) Problems in the Stimulation of Research.

Monday afternoon the participants will join discussion groups meeting concurrently to explore further each of the topics presented in the morning session and to arrive at considered views and recommendations with regard to ways in which the Academy–Research Council can better discharge its responsibilities to science and the nation.

The Divisions of the Research Council will meet separately on Tuesday morning to transact necessary business and to discuss ideas and issues emerging from the sessions of the previous afternoon.

A final plenary session will be held on Tuesday afternoon at which the reports of the Monday afternoon sessions will be presented and discussed, together with any matters from the Division meetings that may be of concern to the entire Research Council.

Lunch will be served to all participants at the Academy–Research Council building on both March 31 and April 1. Following a reception for all members in the Great Hall on Monday, March 31, the several Divisions of the Research Council will hold separate dinners to provide opportunity for discussion within each Division.

U. S. NATIONAL COMMITTEE INTERNATIONAL INSTITUTE OF REFRIGERATION

The second meeting of the U. S. National Committee for the International Institute of Refrigeration (IIR) was held in Washington, D. C., on February 27 and 28. The Chairman, Richard C. Jordan of the University of Minnesota, reported on the meeting of the Executive Committee of IIR held in Paris late in November 1957, which he attended.

Dr. Jordan also attended by invitation a meeting of the Presidents of the nine commissions of IIR. At this meeting plans were made for the 10th International Congress of Refrigeration to be held in late August and early September 1959 at Copenhagen. The present plans call for two or

three plenary sessions covering the following topics: *a*) recent developments and trends in the construction of refrigerating machinery; *b*) refrigerated transport of perishable foodstuffs; and *c*) cold and human beings, with special reference to the endurance of human beings at low temperatures.

The U. S. National Committee decided to establish five technical subcommittees to cover the fields of interest of the nine commissions of the IIR. These subcommittees will deal with the following fields: *1*) basic underlying sciences; 2) refrigeration machinery, application of machinery, and air conditioning; 3) food stuffs and agricultural products, cold stores, and ice making; *4*) refrigerated transport; and 5) education.

VISITING RESEARCH SCIENTISTS PROGRAM

The expanded Visiting Research Scientists Program, which the Academy–Research Council is administering for the International Cooperation Administration, will bring approximately one hundred and fifty young scientists to the United States. The research to be undertaken by participants in this program will be in the natural sciences and engineering.

Beginning in mid-March and ending about mid-May, the following members of the staff of the Academy–Research Council are visiting countries in Asia, Africa, and South America, as well as Europe, to develop plans whereby the scientific academies or equivalent institutions in these countries may assist in the selection of candidates:

WALLACE W. ATWOOD, JR., Office of International Relations
WALTER F. COLBY, Office of Scientific Personnel
HAROLD J. COOLIDGE, Pacific Science Board
ANDRÉ C. SIMONPIETRI, Office of International Relations
M. H. TRYTTEN, Office of Scientific Personnel

Application forms will be furnished to the Selection Committee in each country by the National Academy of Sciences. The Selection Committee will transmit the completed forms for the selected candidates directly to the National Academy of Sciences and the Academy will undertake the placement of the candidates in appropriate research institutions. Following placement, letters of award will be forwarded to the Selection Committees in the various countries for transmission to the candidates.

The National Academy of Sciences will provide round trip transportation for the participant and his dependents from his home to his final destination in the United States and will provide a subsistence allowance for the period of his residence in the United States.

Participants will, in general, remain in the United States for two years. At the end of this period they will return to their respective homelands.

PAKISTAN BOOK PROJECT

The end of March saw the completion of the National Academy of Sciences project to assist in establishing a research and reference library for the recently formed Pakistan Academy of Sciences. On a visit to the United States in 1955, Dr. M. R. Siddiqi, Permanent Secretary of the Pakistan Academy, asked President Bronk for the advice and help of the National Academy of Sciences in developing a list of books for the Pakistan Academy. With a grant of $25,000 from the Asia Foundation, the Academy not only worked up the list covering the fields of agriculture, astronomy, botany, chemistry and chemical technology, engineering, geological sciences, mathematics, medical sciences, natural history, physics, and zoology; but also arranged for the purchase and shipment of the books to Pakistan.

The Asia Foundation, which supported this project, is continuing its efforts to build up scientific activities in Asian countries. To this end the Foundation has established a "Books for Asian Students" project whereby American students and professors may contribute textbooks to Asian schools and scholars. Books in scientific fields should be published after 1945, be of university and college level, and be in good condition. The Foundation will pay transportation costs from the donor to San Francisco and thence to Asia. Any interested donor may obtain additional details concerning the project and shipping arrangements from "Books for Asian Students," 21 Drumm Street, San Francisco 11, Calif.

USES OF ARTIFICIAL SATELLITES FOR RESEARCH IN LIFE SCIENCES

The National Academy of Sciences, the American Institute of Biological Sciences, and the National Science Foundation will jointly sponsor a four-day symposium on methods by which artificial earth satellites can be used to further basic research in the life sciences, May 14–17, at the Academy-Research Council building.

Although research rockets have carried living organisms to altitudes of 200 miles for brief periods, the artificial-satellite program offers life scientists their first opportunity to observe any biological phenomena which may be induced by prolonged stay in the outer atmosphere. The availability of instrumented satellites now makes possible a completely new laboratory for the elucidation of the life processes, in which intense cosmic radiation and continuing weightlessness are two of the valuable and unique experimental tools now at hand for basic research.

The three main objectives of the symposium will be *1*) the exchange of information concerning the technical feasibility and scientific importance of various experiments with living organisms in the satellite environment; 2) the discussion of methods and techniques for conducting such experiments, including associated laboratory work; and 3) the stimulation of thought which will lead to a sound program of research in the life sciences through the use of earth satellites.

Attendance at the symposium will be by invitation only; about 200 biologists, biochemists, biophysicists, psychologists, medical scientists, and others will be invited to participate. About thirty papers will be presented.

BUILDING RESEARCH INSTITUTE

The Board of Governors of the Building Research Institute (BRI) held a joint meeting with the members of the Building Research Advisory Board (BRAB) on February 11 and 12 to discuss the major problems in all fields of the building industry. The first day of the meeting was spent in an effort to define the broad problems facing the building industry today. Eleven speakers dealt with the special problems faced by *1*) creators of buildings (architects, mechanical engineers, and building contractors); 2) research workers on new products; 3) owners and operators of buildings (private and governmental); *4*) housing research (design and construction); 5) urban planning; and *6*) building economics. Each group of talks was followed by a discussion period that brought mass thinking to bear upon the individual opinions expressed by the speakers. Following a second day of discussion, the assembled BRAB-BRI group approved release of a list of problems developed by the speakers as a challenge to everyone concerned with building design and construction.

The BRI Committee on Coordinated Basic Building Research also attended the meeting and presented an "Outline of Building Science" with their report, which pointed up the relationships between building research and research in social, political, natural and physical sciences, as well as economics and finance, and the need for coordination between these fields. The BRI Committee was reappointed and will use the problems defined as guidance for its work in the coming months.

STAFF APPOINTMENTS

The Office of International Relations announces the appointment of **James R. Wilkinson, III,** to be an assistant to the Associate Director in handling the Academy–Research Council relations with international scientific organizations. Before coming to the Academy–Research Council, Mr. Wilkinson was with the Applied Physics Laboratory of Johns Hopkins University. He is a graduate of the University of Pennsylvania.

Richard Park has been appointed Technical Director of the Advisory Committee for the Federal Civil Defense Administration. Mr. Park received his B.S. degree in mechanical engineering from Yale University, and for the past 10 years has served in the Department of Defense as a scientific warfare advisor first with the Research and Development Board and more recently on the staff of the Assistant Secretary of Defense for Research and Engineering.

The Division of Anthropology and Psychology has announced the appointment of **Samuel L. Guskin** as Research Assistant on the staff of the Disaster Research Group. Dr. Guskin received his Ph.D. degree in psychology this year from the University of North Carolina, where he also served as Research Assistant to the Institute for Research in Social Science.

Willard Bascom has been named special consultant to represent the interests of the Academy-Research Council on the new Columbia Broadcasting System-Television network science program "Conquest."

The Maritime Cargo Transportation Conference has appointed **Ernst S. Valfer** as an analyst for the San Francisco Port Study. Mr. Valfer holds an M.S. degree in industrial engineering from the University of California at Berkeley and is currently on leave of absence from the U. S. Naval Air Station, Alameda, Calif.

The Building Research Institute announces the appointment of **Milton C. Coon, Jr.,** as Secretary to the Institute to fill the position vacated by **Hal C. Farrell.** Mr. Coon was formerly with the Tile Contractors Association of America, Inc.

FELLOWSHIP PROGRAMS

NATIONAL SCIENCE FOUNDATION FELLOWSHIPS

For the seventh year the Fellowship Office of the Academy–Research Council has assisted the National Science Foundation (NSF) by receiving and evaluating applications for graduate, postdoctoral, and senior postdoctoral fellowships. The awards were announced by the Foundation on March 15.

This year 3,805 applications were reviewed for graduate fellowships. The eight Graduate Fellowship Evaluation Panels met at the National Academy of Sciences, February 18–20, and the final NSF Graduate Evaluation Board met on February 21. The Board recommended 1,087 applications to the NSF and 756 received awards. Of these 175 were in the life sciences (including anthropology and psychology), 571 in the physical sciences (including engineering and mathematics), and 10 in the convergent fields between the natural and social sciences.

There were 406 applications for postdoctoral fellowships. The preliminary screening was done by the Academy–Research Council Divisional Committees during January. Their reports were prepared for and presented to the NSF Postdoctoral Fellowship Evaluation Board which met on February 19. This Board recommended 117 candidates, 85 of whom were awarded fellowships by the NSF. Of these, 32 were in the life sciences, 50 in the physical sciences, and 3 in convergent fields.

On February 4, the NSF Senior Postdoctoral Fellowship Evaluation Committee met at the National Academy of Sciences to review the 155 applications received for senior postdoctoral fellowships. On February 5, the Senior Postdoctoral Fellowship Evaluation Board recommended 57 finalists. From this list 27 awards were made.

RESEARCH ASSOCIATESHIPS IN NATURAL SCIENCES

Thirty-seven applications were received and reviewed by the Fellowship Office for postdoctoral resident research associateships at Argonne and Oak Ridge National Laboratories, National Bureau of Standards, Naval Research Laboratory, and several research centers of the U. S. Air Force, Air Research and Development Commands. This is the first year the Fellowship Office has processed applications for the Air Research and Development Command.

At its meeting on March 8, the Postdoctoral Fellowship Committee in the Natural Sciences certified 12 candidates to Argonne and 4 to Oak Ridge National Laboratories; 13 to the National Bureau of Standards; 4 to the Naval Research Laboratory; and 3 to the Air Force Research and Development Command.

FELLOWSHIPS IN THE NATURAL SCIENCES

Two of the predoctoral fellowships in the natural sciences awarded last year have been renewed for 1958–59, and one new award has been made. These predoctoral fellowships were established by Leeds and Northrup Company and are administered by the Academy–Research Council. The predoctoral fellowship, established last year by the Institute of Radio Engineers and administered by the Academy–Research Council, was also renewed.

The following list indicates the institution from which the recipient received his degree as well as the nature and location of his fellowship research:

Leeds and Northrop Predoctoral Fellows

David Adler (B.S., Rensselaer Polytechnic Institute, 1956)
Quantum mechanics and theoretical nuclear physics—Harvard University, with Edwin C. Kemble (second renewal)

David Wendell Osborne (B.S., Colorado College, 1957)
Polymer chemistry—University of Delaware (renewal)

George B. Hess (to receive B.S. in June 1958, Princeton University)
Graduate work in physics—Stanford University

Institute of Radio Engineers Predoctoral Computer Fellow

Eugene W. Henry (M.S., Notre Dame, 1955)
Advanced training and research in servo-mechanism electronics—Stanford University (renewal)

COOPERATING SOCIETIES

The following schedule of meetings of Societies cooperating with the National Academy of Sciences–National Research Council has been prepared from information supplied by the Societies. For details regarding a specific meeting, please write directly to the Society Secretary.

January	
9	American Genetic Association, *Washington, D. C.*
13–17	Society of Automotive Engineers, *Detroit*
27–29	American Society of Heating and Air-Conditioning Engineers, *Pittsburgh*
27–30	American Meteorological Society, *New York City*
27–31	Institute of the Aeronautical Sciences, *New York City*
28–30	American Mathematical Society, *Cincinnati*
29–Feb. 1	American Physical Society, *New York City*
30–31	Mathematical Association of America, *Cincinnati*
February	
16–20	American Institute of Mining, Metallurgical and Petroleum Engineers, *New York City*
March	
3	Wildlife Society, *St. Louis*
6–8	Optical Society of America, *New York City*
10–13	American Association of Petroleum Geologists, *Los Angeles*
10–13	Society of Economic Paleontologists and Mineralogists, *Los Angeles*
March	
23–29	American Congress on Surveying and Mapping, *Washington, D. C.*
23–29	American Society of Photogrammetry, *Washington, D. C.*
24–27	Institute of Radio Engineers, *New York City*
25–27	American Meteorological Society, *Kansas City*
April	
	Seismological Society of America, *Los Angeles*
2–4	American Association of Anatomists, *Buffalo, N. Y.*
13–18	American Chemical Society, *San Francisco*
13–18	American Society of Biological Chemists, *Philadelphia*
13–19	American Association of Immunologists, *Philadelphia*
14–18	American Institute of Nutrition, *Philadelphia*
14–18	American Society for Experimental Pathology, *Philadelphia*
14–18	American Society of Pharmacology and Experimental Therapeutics, *Philadelphia*
14–18	American Welding Society, *St. Louis*
14–19	American Physiological Society, *Philadelphia*
16–18	American Surgical Association, *New York City*

April	
21–23	American Academy of Pediatrics, *New York City*
21–23	American Oil Chemists' Society, *Memphis*
24–26	American Association of Pathologists and Bacteriologists, *Cleveland*
27–May 1	American Ceramic Society, *Pittsburgh*
27–May 1	Electrochemical Society, Incorporated, *New York City*
27–May 1	Society of American Bacteriologists, *Chicago*
28–May 2	American College of Physicians, *Atlantic City*
May	
	Engineering Foundation, *New York City*
4	American Federation for Clinical Research, *Atlantic City*
5	American Society for Clinical Investigation, *Atlantic City*
5–7	American Geophysical Union, *Washington, D. C.*
6–7	Association of American Physicians, *Atlantic City*
6–7	Society for Pediatric Research, *Atlantic City*
7–9	Acoustical Society of America, *Washington, D. C.*
12–16	American Psychiatric Association, *San Francisco*
15–16	Operations Research Society of America, *Boston*
18–21	Industrial Research Institute, *Colorado Springs, Colo.*
21–22	American Iron and Steel Institute, *New York City*
June	
	American Astronomical Society, *Madison, Wis.*
	American Society of Mammalogists, *Tucson, Ariz.*
	Society of General Physiologists, *place undecided*
2–3	Society of Naval Architects and Marine Engineers, *Old Point Comfort, Va.*
9–13 (tentative)	Society for the Study of Development and Growth, *South Hadley, Mass. or Waltham, Mass.*
16–18	American Neurological Association, *Atlantic City*
16–20	American Society for Engineering Education, *Berkeley, Calif.*
17–19	American Dairy Science Association, *Raleigh, N. C.*
22–27	American Institute of Electrical Engineers, *Buffalo, N. Y.*
22–27	American Society for Testing Materials, *Boston*
23–25	American Society of Refrigerating Engineers, *Minneapolis*
June	
23–27	American Medical Association, *San Francisco*
August	
5–8	Poultry Science Association, *Ithaca, N. Y.*
17–22	Illuminating Engineering Society, *Toronto, Canada*
18–21	American Veterinary Medical Association, *Philadelphia*
18–22	Association of American Geographers, *Los Angeles*
20–27	Genetics Society of America, *Montreal, Canada*
24–28	American Phytopathological Study, *Bloomington, Ind.*
24–28	Ecological Society of America, *Bloomington, Ind.*
24–28	Mycological Society of America, *Bloomington, Ind.*
25–28	American Society for Horticultural Science, *Bloomington, Ind.*
25–28	American Society of Pharmacology and Experimental Therapeutics, *Ann Arbor, Mich.*
25–28	American Society of Plant Physiologists, *Indianapolis*
25–28	American Society of Ichthyologists and Herpetologists, *Bloomington, Ind.*
25–28	Mathematical Association of America, *Cambridge, Mass.*
25–29	American Society of Limnology and Oceanography, *Bloomington, Ind.*
25–29	American Society of Plant Taxonomists, *Bloomington, Ind.*
25–29	American Society of Agronomy, *Madison, Wis.*
25–29	Soil Science Society of America, *Madison, Wis.*
25–30	Institute of Mathematical Statistics, *Cambridge, Mass.*
25–30	American Mathematical Society, *Cambridge, Mass.*
27–30	American Society of Zoologists, *Bloomington, Ind.*
27–30	Society of Systematic Zoology, *Bloomington, Ind.*
29–Sept. 4	American Psychological Association, *Washington, D. C.*
September	
2–4	Society of Vertebrate Paleontology, *Ann Arbor, Mich.*
2–5	American Physiological Society, *London, Ontario, Canada*
7–12	American Chemical Society, *Chicago, Ill.*
15–19	Instrument Society of America, *Philadelphia*
28–Oct. 1	Society of American Foresters, *Salt Lake City*
28–Oct. 2	Electrochemical Society, Incorporated, *Ottawa, Canada*
30–Oct. 3	American Roentgen Ray Society, *Washington, D. C.*

October	
	Engineering Foundation, *New York City*
6–10	American College of Surgeons, *Chicago*
13–16	Society of Exploration Geophysicists, *San Antonio*
13–17	American Society of Civil Engineers, *New York City*
19–22	Industrial Research Institute, *Washington, D. C.*
20–22	American Oil Chemists' Society, *Chicago*
20–23	American Academy of Pediatrics, *Chicago*
27–31	American Public Health Association, *St. Louis*
27–31	American Society for Metals, *Cleveland*
November	
5–8	American Society of Tropical Medicine and Hygiene, *Miami Beach, Fla.*
6–8	Geochemical Society, *St. Louis*
6–8	Geological Society of America, *St. Louis*
6–8	Mineralogical Society of America, *St. Louis*
November	
6–8	Paleontological Society, *St. Louis*
6–8	Society of Economic Geologists, *St. Louis*
10–13	American Dental Association, *Dallas*
10–14	Institute of Traffic Engineers, *Miami Beach, Fla.*
12–15	Society of Naval Architects and Marine Engineers, *New York City*
20–22	Acoustical Society of America, *Chicago*
28–29	American Society of Animal Production, *Chicago*
30–Dec. 5	American Society of Mechanical Engineers, *New York City*
December	
	American Astronomical Society, *Gainesville, Fla.*
	American Society of Zoologists, *Washington, D. C.*
1–4	Entomological Society of America, *Salt Lake City*
7–10	American Institute of Chemical Engineers, *Cincinnati*
27–30	Biometric Society, Eastern North American Region, *Chicago*
27–30	Society of Systematic Zoology, *Washington, D. C.*

RECORD OF MEETINGS

January	
3	Committee on Cartography, Advisory to Department of State
6	Panel of the USA National Committee for the International Union Against Cancer
6–7	Committee on Soil and Water Conservation
6–10	Highway Research Board, Annual Meeting
7	Building Research Institute, Planning Committee for Building Operation and Maintenance Study Group
7–8	Federal Construction Council, Task Group on Underground Heating Distribution Systems
9–10	Committee on Foods, Subcommittee on High Level Dosimetry, *Lemont, Ill.*
10	Ad hoc Committee on Pathology
11	Advisory Committee for AASHO Road Test
11–12	Screening Committee on Postdoctoral Fellowships in Mathematics
13	Committee on Sanitary Engineering and Environment, Subcommittee on Personnel and Training
14	Prosthetics Research Board
	Committee on Sanitary Engineering and Environment
January	
15	Subcommittee on Waste Disposal
15–16	Screening Committee on Postdoctoral Fellowships in Biology and Agriculture
	Special Advisory Committee on Concrete Admixtures for Slab-on-Ground Construction
16	Committee on Textile Fabrics, *Natick, Mass.*
17	Committee on Flame and Thermal Protective Combat Clothing, *Natick, Mass.*
	Committee on Science in Unesco
	Advisory Board on Education
18	Committee on Preservation of Indigenous Strains of Maize
	Panel on Oceanographic Research Ships
	USA National Committee, International Union on the History and Philosophy of Science
18–19	Screening Committee on Postdoctoral Fellowships in Anthropology and Psychology
19	Committee on Codification, Ciphering, and Punched-Card Techniques, *Pittsburgh*
19–20	Committee on Oceanography
20	USA National Committee, International Scientific Radio Union, Local Arrangements Committee

January	
20–21	Division of Mathematics, Committee on Educational Policy, *New York City*
	Screening Committee on Postdoctoral Fellowships in Chemistry and Chemical Technology
22	Committee on Astronomy, Advisory to Office of Naval Research
	Committee on Development of Substitutes for Waterfowl Feathers and Down, *Natick, Mass.*
	Federal Construction Council, Task Group on Underground Distribution Heating Systems
23	Committee on Aerial Delivery Research, Task Unit on Emergency Re-supply System, *Natick, Mass.*
	Committee on Ship Structural Design and Ship Structure Subcommittee, Joint Meeting
23–24	Mine Advisory Committee
24	Subcommittee on Aerial Delivery Testing Equipment and Procedures, *Natick, Mass.*
	Committee on Ship Structural Design
	Committee on Urban Research
24–25	Screening Committee on Postdoctoral Fellowships in Medical Sciences
25–27	Screening Committee on Postdoctoral Fellowships in Physical Sciences
27	Committee on Applications of Mathematics, *Cincinnati*
	Federal Construction Council, Task Group on Movable Partitions vs. Permanent Partitions
28	Titanium Alloy Sheet Rolling Panel, Sub-panel on Alloy Selection
	Screening Committee for Postdoctoral Fellowships in Earth Sciences
	Special Advisory Committee on Residential Building Sewers
28–30	Committee on Regional Development of Mathematics, *Cincinnati*
29	Panel on Plasma
	Building Research Institute, Planning Committee for Floor Coverings Conference
30	Committee on Foods, Subcommittee on Radiation Preservation, *Gatlinburg, Tenn.*
	Subcommittee on Shock
30–31	Panel on Thermal Protection Systems
31	Subcommittee on Trauma
	Committee on Solids, *New York City*

February	
1–2	Ad hoc Program Panel, USA National Committee for the International Union Against Cancer
2	Subcommittee on Symbols, Nomenclature, and Units, *White Plains, N. Y.*
3	Committee on Visiting Research Scientists Program
	Office of Critical Tables, Advisory Board
	USA National Committee, International Union of Biological Sciences
	Office of Critical Tables, Executive Committee
4	National Science Foundation Senior Postdoctoral Fellowship Evaluation Committee for Physical Sciences, Life Sciences, and Convergent Fields
	Subcommittee on Continuously Reinforcing Steel in Concrete Pavements
	Building Research Institute, Committee on Coordinated Basic Building Research, Subcommittee Chairmen, *New York City*
5	Building Research Institute, Planning Committee for Paints and Protective Coatings Conference
	National Science Foundation Senior Postdoctoral Fellowship Evaluation Board
6	Federal Construction Council, Operating Committee
	Ad hoc Committee on Dishwashing Machines, *Natick, Mass.*
	Panel on Transfusion Problems
	Technical Advisory Panel on Performance Rating for AASHO Road Test, *Chicago*
7	International Conference on Scientific Information, Program Committee
	Conference on Blood Problems in Extracorporeal Circulations and Massive Transfusions
	Panel on Blood Coagulation
7–8	Panel on Optical Production Equipment, *Southbridge, Mass.*
8	Subcommittee on Amino Acids
	Subcommittee on Research Reactors
	Division of Earth Sciences, Executive Committee
	Subcommittee on Blood and Related Problems
9	National Academy of Sciences–National Research Council, Governing Board
	Panel on New Devices for Exploring the Ocean
10	Special Advisory Committee on Residential Building Sewers
11	Ship Structure Subcommittee
11–12	Building Research Advisory Board and Building Research Institute Board of Governors

February	
12	Committee on Amino Acids
13	Advisory Board of Quartermaster Research and Development, *Natick, Mass.*
	Symposium on Maritime Research
	Maritime Cargo Transportation Conference, Steering Committee
13–14	Symposium on the Electron Probe Microanalyzer
14	Maritime Research Correlation Conference
	Panel on New Devices for Exploring the Ocean, *La Jolla, Calif.*
15	Air Force Special Study Project
15–16	Committee on Oceanography, *La Jolla, Calif.*
16–18	Advisory Committee on Civil Defense, *Battle Creek, Mich.*
17	National Science Foundation, Final Graduate Evaluation Board
17–18	Committee Advisory to U. S. Army Chemical Corps
	Committee on Fire Research, *Battle Creek, Mich.*
18	Committee for Studies of Analgesics
18–20	National Science Foundation Graduate Fellowship Evaluation Panels for Anthropology and Psychology, Biological Sciences, Chemistry, Convergent Fields, Earth Sciences, Engineering, Mathematics, and Physics and Astronomy
19	National Sciences Foundation Postdoctoral Fellowship Evaluation Board
20–21	Food Protection Committee, Toxicology Subcommittee
21	Committee on Mathematics, Advisory to the Office of Naval Research, *New York City*

February	
21	National Science Foundation Final Graduate Evaluation Board
23	Institute of Laboratory Animal Resources, Committee on Standards, Executive Committee, and Subcommittee on Technical Guidance
	Toxicological Information Center, Advisory Committee
24	Committee on Radiology
	Advisory Panel on Proposed Survey on Alcoholism
	Institute of Laboratory Animal Resources, Governing Board
25	Committee on Urban Research, Planning Committee
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26	Committee on Ship Steel, Project Advisory Committee SR–139
	Federal Construction Council, Task Group on Noise Control in Building Design
27	Committee on Guardrails and Guideposts, *Baltimore*
	Committee on Physical Aspects of Durability of Concrete, *Chicago*
	USA National Committee, International Union of Physiological Sciences
	International Conference on Scientific Information, Program Committee
27–28	Materials Advisory Board, Panel on Design Criteria
	USA National Committee, International Institute of Refrigeration
28	Panel on Oceanographic Research Ships
28–Mar. 1	Medical Fellowship Board

NEW PUBLICATIONS

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National Research Council. Committee on Landslide Investigations. *Landslides and Engineering Practice . . . Edited by Edwin B. Eckel.* Washington, 1958. (NAS–NRC Publication 544. Highway Research Board Special Report 29.) 232 p., illus. $6.00.

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Notice of Academy Meetings

NATIONAL ACADEMY OF SCIENCES

Annual Meeting, Washington, D. C., April 28-30, 1958

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL

Governing Board, Washington, D. C., April 27, 1958

Governing Board, Washington, D. C., June 15, 1958

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